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Graduate Returns, Degree Class Premia and Higher Education Expansion in the UK

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Abstract
We investigate the extent to which graduate returns vary according to the class of degree achieved by UK university students and examine changes over time in estimated degree class premia. Using a variety of complementary datasets for individuals born in Britain around 1970 and aged between 30 and 40, we estimate an hourly wage premium for a 'good' (relative to a 'lower') class of degree of 7% to 9%, implying a wide spread around the average graduate premium. We also estimate the premium for a good relative to a lower degree for different cohorts (those born between the mid-1960s and early-1980s) and find evidence that the premium for a good degree has risen over time as the proportions of cohorts participating in higher education have increased.

Keywords: Graduate returns, higher education participation, ability composition
JEL codes: J31; J24; I23; D82

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1. Introduction

Estimates of returns to education tend to measure education either by the number of years of schooling or by the level of qualification attained. There is little analysis of how returns vary according to the level of academic performance (for example, by grade point average) *given* the level of qualification or years of schooling. This is particularly surprising given that employers often recruit at specific educational levels and, in ranking candidates, are likely to consider grades or marks achieved. In the current paper, we examine evidence on the extent to which graduate returns in the UK vary with the class of degree achieved, where degree classification has four main categories: first (I), upper second (II.1), lower second (II.2) and third (III) class degrees.[1] Students commonly perceive that post-university career prospects can be affected by class of degree, consistent with the Association of Graduate Recruiters report in 2010 that 78% of employers filtered out applicants who had not achieved at least an upper second class degree (see AGR, 2010).

This paper has two main aims: first, to produce estimates of returns to different classes of degree for a specific cohort and, second, to examine how the estimated differentials have behaved over time, in the context of substantial changes within both higher education (HE) and the labour market. The participation rate of young people in HE in the UK – having been stable at about 13-14% from 1970 through to the mid-late 1980s – rose rapidly after 1987 to reach 20% in 1990 and 30% in 1995, after which it broadly stabilised at 33%. Walker and Zhu (2008) find that during the period of rapid expansion in UK HE participation, the return to a degree did not change *on average*. We are interested in examining changes in returns over time across the degree class distribution. Other factors are also likely to influence returns by class of degree, including skill-biased technological change and the tightness of the graduate labour market. We also note that the proportion of degrees classified as either firsts or upper seconds has been increasing over time (from 38% in 1985 to 54% in 1998) with potential consequences for degree class premia.

Our analysis exploits a variety of datasets. From the 1970 Birth Cohort Study (BCS70), we exploit rich information on personal characteristics such as ability scores, personality traits and family background to produce estimates of the return to a degree relative to a control group of individuals who did not attend university but with A-level qualifications which would have enabled them to do so.[2] Our analysis is similar to that of Blundell *et al*. (2000, 2005) for the similarly structured National Child Development Study (NCDS) for the 1958 birth cohort but, in addition, we distinguish between graduates with 'good' (first or upper second) and with 'lower' (lower second or below) degree classes to derive an estimate of the premium for a good relative to a lower class of degree. The birth cohort data minimise problems of bias associated with selection on unobservables, but do not permit comparisons over time in the evolution of returns by class of degree, as this was not recorded in NCDS data. For a comparison over time, we exploit successive years of Labour Force Survey (LFS) data. Estimates from LFS data, which are not rich in ability and background characteristics,

[1] Below these are Pass and Ordinary degree classes, which we label collectively as 'Other'.
[2] A-levels taken in the final year of secondary school in England and Wales are the typical qualification on which admission into university is based.

can be compared with those based on BCS70 data to check the extent to which they might suffer omitted variable bias. Both BCS70 and LFS data contain relatively small samples of graduates compared to administrative data on full populations of successive cohorts of university graduates, which are available from the Universities Student Records (USR) and its successor, the Higher Education Statistics Agency (HESA). These student records are rich in information on prior qualifications and other personal characteristics and also enable us to observe time trends through the generation of estimates for successive cohorts. However, they permit only the use of occupational, rather than of individual, earnings one year after graduation through their link to First Destination Survey (FDS) data. Therefore, we complement these data with Graduate Cohort Surveys (GCS), which cover only samples of graduates, but which have individual earnings data at both 1 and 6 years post-university.

The rest of this paper is organised as follows. Section 2 locates our analysis within the existing literature on graduate returns. Section 3 provides the rationale for our choice of data and methodology. Section 4 reports an estimated wage premium for a good degree relative to a lower degree class of *circa* 7% by age 30 for graduates born in 1970. We suggest that this implies substantial variation in returns by academic performance, given our estimated wage premium for a lower degree class over A-levels of around 11%. We find similar estimates for the good degree premium for both BCS70 and LFS data, based on cohorts born in or close to 1970: this gives us confidence that analysis based on LFS data do not suffer particular problems of omitted variable bias and, hence, can be used as part of our investigation of changes across cohorts. Section 5 presents estimates of degree class premia for series of cohorts born between the mid-1960s and the early 1980s, using both LFS and USR-HESA/FDS data. Among other results, we find the pay premium for a good degree to be stable for graduates who had entered HE in 1987 or earlier, after which there is evidence that the premium doubled in magnitude over the period in which the higher participation cohorts entered the labour market. Section 5 closes the paper with conclusions and further remarks.

2. Literature Review

Graduates' earnings might vary with academic performance at university either because employers treat performance as a signal of potential productivity or because degree class is a measure of human capital acquired. Suppose the econometrician estimates that the premium associated with academic achievement at university is high. How might we interpret such a finding? Under a signalling approach with employer learning (see, for example, Altonji and Pierret (2001), Farber and Gibbons (1996) and Lange (2007)), we might view the premium as reflecting the *employer's* lack of information about the worker's productivity at the point of recruitment and expect that the estimated premium would diminish with the worker's tenure as the employer acquires information on worker productivity. Under a human capital approach, we would interpret the premium as reflecting a greater acquisition of human capital by the graduate and would want to be sure that there was no ability bias in the estimated premium reflecting the *econometrician's* lack of information on the graduate's ability or productivity. Under either approach, evidence that the premium is high is likely to be interpreted as indicating substantial variation in post-university outcomes by degree class: even if the premium is a consequence of signalling, students might be concerned that failure

to obtain a good degree might reduce their long-term labour market prospects.[3] If potential university applicants perceive there to be a wide variation in graduate earnings according to academic performance, then this might deter applications – especially among individuals less confident of their capacity to perform well at university. In this context, we note evidence (Smith and Naylor, 2001; Crawford, 2014) that university performance differs by social class of family background.

Arcidiacono *et al*. (2010) provide evidence for the US that while signalling in an employer learning/statistical discrimination (EL-SD) approach might be relevant for understanding returns to high school graduates, it is less applicable for college graduates as employers have considerable information about the latter, for whom the grade point average together with transcripts and other information, such as standardised test scores, reveal rather than merely signal ability. This contrasts with traditional institutional features in the UK, where secondary school leavers receive certificates showing detailed information about performance in national examinations at ages 16 and 18, while university graduates receive relatively less finely calibrated measures. This suggests that signalling is likely to be more relevant in countries, like the UK, in which graduates receive and convey relatively limited information on their performance.[4]

Classification of degrees in the UK is based on performance in examinations and in any assessed coursework, typically in the final two years of the traditional 3-year degree course. Examinations are set and marked within each university at the subject level, but classifications are intended to be broadly comparable across institutions through a system of moderation based on external examiners from other universities. External examiners are involved at all stages of examination and, typically, are regarded as decisive at the point of classification in final examination boards. Nonetheless, it cannot be assumed that there is absolute parity across institutions in degree classification and in our analysis we examine whether results are robust across universities.

There is no national dataset containing information on the underlying marks which form the basis for the class of degree awarded to the student. In our analysis, class of degree is the sole measure of student performance and so we cannot identify whether degree class acts simply as a proxy for performance or whether it operates as a signal of ability over and above underlying marks. In an important paper, Feng and Graetz (2015) adopt a regression discontinuity approach in which they exploit detailed information about students' course marks to compare early occupational earnings of those graduates who just make a particular degree class with those who just miss out.[5] We see our analysis as providing evidence complementary to the single-institution RD design of Feng and Graetz.

There are various reasons why any pay premium for a good degree class might have been changing across the cohorts examined in our analysis. First, graduate unemployment rates have changed over time. Individuals graduating in 1985 (our earliest cohort) entered a labour

[3] If employers do not learn (see, for example, Habermatz, 2014), then signals can have long-run effects.

[4] There is a growing tendency in the UK for universities to issue more detailed transcripts, in part to conform with recent regulations regarding the production of Higher Education Achievement Reports for each student.

[5] See also Di Pietro (2010), who uses a RD approach to examine effects of degree class on employment outcomes.

market in which the unemployment rate among graduates was relatively high, at about 4%.[6] The rate then fell to 2% by 1990, rose to a peak of 4.5% in 1993 and returned to 2% by 2000, remaining essentially constant until 2008. *A priori*, it is not clear whether a slack graduate labour market might exaggerate the penalty for a relatively poor academic performance, or whether a tight market might augment the premium for a strong performance. But, if graduate unemployment is a major driver of the degree class premium, one would expect the behaviour in the premium to reflect cyclical trends in the unemployment rate over this time interval.

Second, skill-biased technological change (SBTC) is a potential driver of increased returns to education. It is also conceivable that any impact of SBTC might have been more pronounced among higher performing graduates. However, most analysis of SBTC focuses on its impact on pay in the 1970s and 1980s (Card and Di Nardo, 2002, and Haskel and Slaughter, 2002) and, therefore, we would expect any impact to be already apparent among the early cohorts we observe.

Third, the participation rate of young people in HE in the UK was broadly stable from 1970 to 1985, but began to rise thereafter, especially after 1987, to reach 20% by 1990 and 30% by 1995. In a US context, Blackburn and Neumark (1991, 1993) and Blackburn, Bloom and Freeman (1990) investigated – and rejected – the hypothesis that a participation-induced change in the relationship between ability and education might have explained the observed rise in the college wage premium from the 1970s: see also Taber (2001), Chay and Lee (2000), Rosenbaum (2003) and Cawley *et al.* (2000). For the UK, Walker and Zhu (2008) argue that with expansion of higher education, universities have been admitting individuals with lower unobserved skills and this is likely to have weakened the correlation between education and ability, with a potentially negative impact on graduate returns. However, they find that returns did not fall *on average* during the period of rapid expansion.[7] Our interest lies in how expansion might have affected the correlation between educational achievement and ability *among* graduates, rather than that *between* graduates and non-graduates. The application to this issue of the theoretical framework of Blackburn and Neumark (1991, 1993) generates the prediction that an increase in the higher education participation index will increase the premium associated with a good degree class.[8] Intuitively, as more of the cohort obtain a degree, the greater is the signalling value of a higher class of degree.

Fourth, and working against any positive impact of HE expansion on the good degree premium, we note from USR and HESA data that the proportion of good degrees awarded has increased over time, from 38% in 1985 to 47% by 1993 and 54% in 1998. This is often interpreted as evidence consistent with grade inflation, which would be likely to reduce the relative return to a good degree through narrowing the associated ability gap across good and lower degree class recipients (see Ireland *et al*., 2009).

[6] Calculations of the graduate unemployment rate are based on LFS data.
[7] See also Harkness and Machin (1999) and Moffitt (2007) for evidence on changes over time in the average returns to a degree in the UK.
[8] This is demonstrated in Ireland *et a*l. (2009).

3 Data and Methodology

Our initial objective is to produce estimates of returns to degrees by class of degree awarded for a single cohort, exploiting British Cohort Study (BCS70) data on a cohort of babies born in Britain in a particular week in April 1970. These data are rich in information on individual characteristics, such as family background and both cognitive and non-cognitive ability. British national birth cohort data, however, do not permit analysis of trends in estimated degree class premia as the preceding cohort study, the National Child Development Study (NCDS) for the 1958 cohort, does not contain information on class of degree, while individuals followed in the Millenium Cohort Study (MCS) are not yet entering higher education.

In order to generate estimates of degree class premia over series of cohorts, we exploit data from the Labour Force Survey (LFS), a sample survey of UK households interviewed over 5 consecutive quarters. LFS data do not provide the rich information on ability, background and personality traits contained in BCS70 and, hence, there is a potential concern that estimates generated in LFS might suffer omitted variable bias. We check for this by constructing within LFS a cohort of individuals born in or close to 1970 and comparing estimated degree class premia for these individuals with estimates obtained from BCS70 data. In order to examine variations over time in degree class premia, we use LFS to produce estimates for birth cohorts ranging from 1973/74 to 1981/82. Typically, individuals participating in HE from these cohorts would have matriculated between 1991 and 2000, encompassing the latter half of the period of rapid expansion which occurred from 1987 to 1995.

A limitation of both BCS70 and LFS data is that they contain relatively small samples of graduates compared to administrative data on full populations of graduates held by the University Statistical Record (USR) prior to 1994 and, subsequently, by the Higher Education Statistics Agency (HESA). These data can be matched to First Destination Surveys (FDS) which record labour market outcomes of graduates within one year of graduation. We produce estimates of the earnings premium for a good relative to a lower degree class using USR/FDS data for individuals graduating in 1991 (and born in 1970) to check for consistency with our BCS70 and LFS estimates. We then use USR/FDS (and subsequent HESA/FDS) data to generate estimates of good degree premia for cohorts born between 1964 and 1977 and hence, typically, matriculating between 1982 and 1995, capturing periods just prior to and during the expansion observed after 1987.

Finally, we are able to check the sensitivity of our USR-HESA/FDS based estimates to the use of occupational earnings one year after graduation by exploiting Graduate Cohort Survey (GCS) data, which provide personal salary information based on a postal survey of 5% of the population of 1990 leavers from a selection of UK universities, both 1 year and 6 years after graduation. We exploit GCS1990 data, which is the closest we can get to a 1970 birth cohort and captures those graduating in 1990 and born between 1968 and 1970. Estimates based on GCS1990 data can also be compared with those from GCS1985 data to check for a time trend

in a period of stable HE participation rates: the 1990 graduates would have matriculated just prior to the period of rapid expansion.

Our initial analysis, then, uses BCS70 data to generate benchmark estimates of degree class premia for the 1970 birth cohort. Our approach is similar to that adopted by Blundell *et al*. (2000) in their analysis of graduate returns using NCDS data on the 1958 birth cohort. We select all those individuals with at least two A-Levels and compare outcomes of individuals with HE qualifications with those of individuals who did not participate in HE despite having sufficient prior qualifications. We are able to distinguish between graduates with 'good' (first or upper second) and with 'lower' (lower second or below) degree classes to derive estimates of the premia for (i) a good relative to a lower class of degree and (ii) a lower class degree relative to just A-level qualifications. We deem cell sizes too small to generate robust estimates of premia for individual degree classes and choose the binary distinction between 'good' and 'lower' primarily because this coincides with the *a priori* important difference between an upper second and a lower second degree.

Like Blundell *et al*., we rely on the richness of the longitudinal birth cohort data on personal and family characteristics, which we use to proxy typically unobserved characteristics. We estimate the equation:

$$\ln w_i = \beta' E_i + \gamma X_i + \varepsilon_i \qquad (1)$$

where w_i is the natural logarithm of the real hourly wage rate, observed at age 30; E_i is a set of dummy variables identifying the class of degree awarded to the individual, relative to a default of no degree; and β measures the return to degree class conditional on the exogenous observed characteristics, X_i. We include controls for a wide range of individual characteristics, including family background and measures of both cognitive and non-cognitive ability. The approach assumes that conditioning on the observable characteristics is sufficient to control for the endogeneity of educational choices and outcomes. OLS estimation of (1) is unbiased if the mean independence condition is satisfied, that is, if $E(\varepsilon_i \mid E_i, X_i) = E(\varepsilon_i \mid X_i)$. Dearden (1999), using NCDS 1958 birth cohort data, reports that OLS produces reasonable estimates of the true causal effect of education on wages and given the similarities between NCDS and BCS70 data this gives us further confidence in our own estimates.

In order to examine the evolution of returns by class of degree, we exploit successive years of Labour Force Survey data, which have contained information on degree class since quarter 4 of 2005. We compare estimates generated from regressing (1) on LFS data for individuals born in or close to 1970 with our BCS70 results in order to check the extent to which LFS estimates might suffer omitted variable bias given the relative paucity of ability and other individual characteristics, within the set X_i, compared to the birth cohort data. E_i is defined as with BCS70 data, with a default of 2 or more A-levels and dummy variables for good and for lower degree classes.

In our analysis of USR-HESA/FDS data, w_i refers to occupational earnings, which are observed just one year after graduation. Earnings information is not collected in the FDS and so we attribute to each graduate the gender-specific average lifetime earnings of the occupation in which they are employed.[9] The set of characteristics, X_i, is relatively rich as USR-HESA data contain detailed information on prior qualifications and on parental occupation and residence. The educational attainment variable, E_i, is different from that within the BCS70 and LFS analyses as there is no control group of individuals who did not attend university. The default is now the award of a lower class of degree with a dummy variable for the award of a good degree. Hence, we are able to produce an estimate of the good degree premium only. This is also true of our analysis of GCS data.

4 Results I: Birth cohorts circa 1970

In Section 4.1, we present results based on analysis of BCS70, which we then compare with results from LFS data in Section 4.2. A key objective is to check whether estimates of degree class premia are similar across the two datasets. Section 4.3 then presents results based primarily on USR/FDS data, which benefit from covering a greater proportion of each graduate cohort.

4.1 Evidence from the British Cohort Study: birth cohort 1970

Table 1 presents results based on OLS estimation of equation (1) using BCS70 data on individuals who obtained at least two A-levels. The original cohort consists of 16,135 individuals, of whom 4,315 have at least one A-level and 4,138 have two or more. We have age 30 wage information and, for graduates, degree class information on 3,046 individuals. Table 1 reports estimates of log-wage premia associated with both (i) a good degree class relative to a lower degree class and (ii) a lower degree class relative to A-levels. [10,11] We present results for males and females combined as we cannot reject the hypothesis that the estimated premia are the same for men and women. The table shows estimates from five specifications. The base case is Specification 1 which controls for a set of basic characteristics from both childhood (gender, ethnicity, region of residence) and adulthood (marital status and number of children). Specification 2 additionally includes parental income and social class, each parent's education, and each parent's interest in the child's education; Specification 3 also includes measures of ability at age 10, based on numerical and verbal British Ability Scores (BAS); Specification 4 adds BAS measures at age 5; and Specification 5 adds non-cognitive ability measures at ages 5 and 10, based on child, parent or teacher responses on dimensions of the child's self-esteem, locus of control, sociability, extroversion, hyperactivity, conscientiousness, anxiety and clumsiness. Specification 5 is motivated by the literature on the impact of non-cognitive personality traits on both education and labour

[9] From FDS data, we know the graduate's occupation at the 4-digit SOC level but match to this occupational earnings information from LFS data at the 3-digit level: cell sizes are too sparse at the 4-digit level. Feng and Graetz (2015) adopt a similar earnings measure.

[10] We find that results are not sensitive to whether the default is an individual with one or with two or more A-levels.

[11] We have also produced estimates based on a control function approach and on propensity score matching and obtain results very similar to those based on OLS.

market outcomes: see Heckman *et al*. (2000), Carneiro *et al*. (2007) and Blanden *et al*. (2007).

Table 1: Estimated log wage premia (BCS70), birth cohort 1970

Specification:	1	2	3	4	5
Wages observed in year:	2000	2000	2000	2000	2000
Wages observed at age:	30	30	30	30	30
Good degree class premium	0.078	0.077	0.073	0.071	0.068
relative to lower degree class	(0.007)	(0.008)	(0.012)	(0.014)	(0.019)
Lower degree class premium	0.119	0.105	0.107	0.103	0.109
relative to 2+ A-levels	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Controls:					
Family background	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Ability at age 10	*No*	*No*	*Yes*	*Yes*	*Yes*
Ability at age 5	*No*	*No*	*No*	*Yes*	*Yes*
Non-cognitive ability	*No*	*No*	*No*	*No*	*Yes*
Base controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
No. of Obs	3046	3046	3046	3046	3046
R^2	0.081	0.099	0.103	0.112	0.119

Notes: p-values reported in parentheses. Dependent variable is log gross hourly wage in 2000 prices. For details of controls, see text.

The estimated wage premium for a good degree relative to a lower degree class is 7.8% under Specification 1. As controls for family background, cognitive and non-cognitive abilities are successively included, the estimated good degree class premium falls monotonically to 6.8% under Specification 5, which is our preferred specification, with each set of controls jointly significant. The estimated return for a lower class of degree over two or more A-levels falls from 11.9% under Specification 1 to 10.9% under Specification 5. Hence, our estimates indicate that the wage premium for a good relative to a lower degree is approximately two-thirds that for a lower degree relative to A-level qualifications only and that the average estimated graduate wage premium at age 30 is approximately 15%.[12]

Blundell *et al*. (2000) found that the average returns to a degree were substantially higher for women (at *circa* 37%) than for men (*circa* 17%) for the 1958 birth cohort. In contrast, we find no significant gender differences in the effects of either degree class or of obtaining a degree on wages for the 1970 birth cohort: the estimated coefficients on the interaction of gender with good degree and with lower degree have p-values of 0.878 and 0.815, respectively. Changes in the composition of graduate and non-graduate females, associated with the large increase in female HE participation, might explain part of a falling graduate premium for women. Our analysis does not correct for endogenous selection into employment: as Dearden (1999) observes, there are no convincing candidates for instruments which might affect employment but not wages, even in the cohort data. For men, it is unlikely that this represents a serious problem for our estimates as the employment rate is 97% (at age 30) both for those with A-levels and for those who participated in HE. Among women, the

[12] Calculated by weighting the good degree and the lower degree class premia by the respective proportions with good and lower degrees.

employment rates at age 30 are 85% for those with A-levels only and 92% for those with a degree and so, potentially, our estimates of the overall returns to a degree for women might be downward biased. We note that this difference in employment rates by education level is less pronounced than that reported by Blundell *et al*. from NCDS, limiting the comparability of results for women across the cohorts.

It might be the case that not all returns to HE are realised by age 30. In supplementary analysis based on wages at age 38, we find the good degree premium to be broadly unchanged compared with results reported in Table 1. In contrast, the return to a lower class degree over the A-level default is double that noted above at age 30. This is likely to be a result of both (i) the steeper age-earnings profile of graduates relative to non-graduates and (ii) the general increase in inequality occurring in the period 2000 to 2008. We note that the estimated coefficients at age 30 – with the higher response rate – are more precise than at age 38, where attrition causes the sample to fall from 3046 to 1642 observations. The estimated premium for a good degree is robust to analysis of those who responded at both 30 and 38.

Our principal finding from the BCS70 analysis, then, is that there is a statistically significant premium of approximately 7% at age 30 (and at age 38) associated with the award of a good degree relative to a lower degree class. The magnitude of this premium is perhaps surprising; it is not much smaller than the premium for a lower class degree over A-levels. We find no significant differences in the degree class premium across broad subject fields: an F-test for the joint significance of the interaction terms produces a p-value of 0.718 at age 30.[13]

4.2 Evidence from Labour Force Survey data: birth cohorts 1969-1971

LFS data can be used to produce estimates for different cohorts but as they do not contain rich information on ability and family background, it is important to check that estimates based on LFS do not suffer from omitted variable bias. Within LFS, we construct cohorts of individuals born between 1969 and 1971, and aged 36-41, and replicate our BCS70 analysis as closely as possible.[14] Results, reported in Table A1 (see Appendix), show an estimated premium for a good degree relative to a lower degree class of 8.8%. This is close to the estimates obtained from BCS70, especially with that of 7.8% from the specification without controls for ability and family background (which are not available in the LFS data).[15] The estimated premium for a lower degree class relative to A-levels, at 18.8%, is intermediate between the estimates obtained from the BCS70 data for ages 30 and 38. As with the BCS70 data, we find no significant differences either by gender or subject studied in the effects either of degree class or of obtaining a degree on wages. From the results, we have confidence that the absence from LFS data of the rich controls available in BCS70 does not cause major

[13] There are, however, significant differences across subjects in the return to a lower class degree over A-levels, consistent with a wider literature on how UK degree returns vary by subject of study. See, for example, Lissenburgh and Bryson (1996), Harkness and Machin (1999), Walker and Zhu (2001, 2011), Dolton and Makepeace (1990), Chevalier *et a*l. (2002), Belfield *et a*l. (1997), Battu *et a*l. (1999). We leave detailed analysis of this for further work.

[14] We aim for a data set as similar as possible to that based on BCS70 data but broaden out the year of birth to a 3-year window in order to have a reasonable sample size. Information on class of degree has been available in LFS only since 2005 onwards, limiting the age range we can observe for any cohort.

[15] Our estimates are also similar to the average of those reported in Walker and Zhu (2011).

problems of bias in estimates of degree class premia. LFS data are then used to estimate the good degree premium for a series of cohorts, as reported in Section 5.

4.3 Evidence from USR/FDS data: birth cohorts 1969-1971

The major advantage of USR data is that they provide rich and high quality administrative data on complete populations of UK university students: the file of 1991 leavers contains information on all 83,932 degree-level students leaving university that year. Of these, 92% of UK-domiciled graduates responded to the FDS, of whom 49% were in employment. Of graduates born between 1969 and 1971, a total of 22,459 employed graduates identified their particular occupation. Cell sizes are much greater than with either BCS70 or LFS data. Table 2 presents estimates of log earnings premia for a good degree over a lower degree, based on estimating equation (1), using the log of occupational earnings for the dependent variable.[16]

Table 2: Estimated log earnings premia (USR91, graduate cohort), birth cohort 1969-1971

Earnings observed at:	1992	1992
Earnings observed at age:	21-23	21-23
Good degree class premium	0.046	0.043
relative to lower degree class	(0.000)	(0.000)
Ability and background controls	*No*	*Yes*
Other controls	*Yes*	*Yes*
No. of Obs.	22,459	22,459
R^2	0.334	0.336

Notes: p-values reported in parentheses. Dependent variable is log of gender-specific median occupational earnings. Ability controls include detailed pre-university qualifications. Background controls include social class of parents and school type. Other controls include gender, marital status, university attended and type of degree course.

The results reported in Table 2 show an estimate of 4.6% for the good degree class premium, or 4.3% when controls for prior qualifications and family background are included. Again, we find no significant variation in the estimated coefficients for a good degree by subject studied: the p-value for the joint significance of the interaction between degree class and broad subject area is 0.391. We conclude that there is further corroborating evidence of a statistically significant premium associated with the award of a good degree class to graduates born in *circa* 1970.

A weakness of the USR/FDS data is that in the absence of information on individuals' earnings, we use average earnings of the occupation in which the graduate is employed within one year of graduation. The use of life-time earnings means that we are mitigating potential problems of using initial career earnings, which may be a noisy indicator of later career prospects. However, graduates will change occupation over time and degree class may well be correlated positively with the probability of transiting into a higher earning occupation. Similarly, given our use of median occupational earnings, we do not capture intra-occupational differences in earnings across graduates. These differences are unlikely to

[16] We have also estimated a multinomial logit model of first destination outcomes based on: employment; further study; unemployment or inactivity; and non-response. Correcting the occupational earnings equation for possible self-selection, we find that the p-values on the correlation term are not significant even at the 10% level. Hence, reported results are from OLS earnings regressions.

be randomly distributed: potential correlation between intra-occupational earnings and degree class is likely to be positive. Hence, we interpret results reported in Table 2 as lower-bound estimates of the effects of degree class on graduates' earnings.

The USR-based estimates of 4.3% to 4.6% are indeed lower than the estimates of 6.8% to 8.8% from the BCS70 and LFS datasets, consistent with the use of life-time median occupational earnings from USR-FDS data. To check this further, we have also examined data from the 1990 Graduate Cohort Study (GCS1990), conditioning on the graduate being aged 21-23 when wages are observed one year after graduation. Results are presented in Table A2 and show the estimated wage premium for a good degree to be 4.9%, close to the USR-based estimate of 4.3% one year after graduation, when ability and background controls are included. This suggests that the use of occupational earnings rather than personal earnings does not itself make a substantial difference to the estimates. Looking at GCS1990 data six years after graduation and conditioning on being aged 26-28, we estimate the premium for a good degree to be 7.9%, close to the estimates for BCS70 (for ages 30 and 38) and LFS (for ages 36-41).

We conclude from our analysis that there is robust evidence of a significant wage premium for a good class over a lower class of degree for individuals born in or *circa* 1970 and graduating in or close to 1991. At least for graduates more than 5 years out of university, our estimates of the wage premium all lie in the range 6.8% – 8.8%. That our estimate of the premium for a good degree based on LFS data is very close to that based on BCS70, with its richer sets of controls, reassures us that the LFS-based estimates do not suffer serious problems of omitted variable bias. Evidence from both BCS70 and LFS data suggests that between the ages of 30 and 40 the wage premium for a good degree is essentially constant, while our analyses of USR/FDS and GCS90 data indicate that the good degree premium increases in the early part of the graduate's career – from around 5% to 8% – between 1 and 6 years out of university.

5 Results II: Changes across cohorts

From the results presented in Section 4, it appears that for individuals born in or close to 1970 and graduating around 1991, there was a wage premium for a good relative to a lower degree class of approximately 7% – 9%. However, as discussed in Section 2, there are reasons why the premium might have been different for other cohorts. Section 5.1 presents results based on LFS data for individuals born between 1973 and 1982. Section 5.2 reports on analysis of USR-HESA/FDS data for graduates born around the period 1964 to 1977.

5.1 Evidence from Labour Force Survey data: birth cohorts 1973/74 to 1981/82

We use information from LFS between 2005 and 2013 to make a series of comparisons of the premium for a good degree across birth cohorts at specific ages. Estimates of the log wage premium, based on OLS regression of equation (1), are reported in Table 3.

Table 3: Estimated log-wage premia for a good degree (LFS), selected ages and birth cohorts

Birth Cohort	1973/74	1975/76	1977/78	1979/80	1981/82
Panel A					
Wages observed at:	-	-	2005-09	2007-11	2009-13
Wages observed at age:	-	-	28-31	28-31	28-31
Good degree class premium	-	-	0.062	0.033	0.117
relative to lower degree class			(0.070)	(0.246)	(0.000)
No. of obs	-	-	1297	1587	1504
R^2	-	-	0.119	0.138	0.130
Panel B					
Wages observed at:	-	2005-09	2007-11	2009-13	-
Wages observed at age:	-	30-33	30-33	30-33	-
Good degree class premium	-	0.114	0.107	0.047	-
relative to lower degree class		(0.001)	(0.001)	(0.111)	
No. of obs	-	1313	1474	1526	-
R^2	-	0.135	0.131	0.131	-
Panel C					
Wages observed at:	2005-09	2007-11	2009-13	-	-
Wages observed at age:	32-35	32-35	32-35	-	-
Good degree class premium	0.090	0.090	0.113	-	-
relative to lower degree class	(0.012)	(0.005)	(0.000)		
No. of obs	1394	1496	1358	-	-
R^2	0.162	0.180	0.133	-	-

Notes: p-values reported in parentheses. Dependent variable is log hourly wages observed between 2005Q1 and 2012Q4 and deflated by the average earnings index. Other controls include: gender, marital status and number of children, ethnicity and tenure with current employer.

We group individuals by birth cohort and window of observation, producing estimates of the returns to degree class for individuals at ages 28-31, 30-33 and 32-35. Graduates from the 1973-74 birth cohorts would, typically, have matriculated in 1991-1992, while graduates born in 1981-1982 would have matriculated in 1999-2000. Thus, the data window spans the period of HE expansion. Panel C reports estimated premia for those aged 32-35 within the observation window 2005-2013. The estimated wage premium for a good degree for those born in 1973-74 is 9.0%. The same estimated premium is found for those born in 1975-76. But for those born in 1977-78, the premium is 11.3%: so there is some indication of a rising premium across these successive cohorts at ages 32-35.

From Panel B, for the age group 30-33, the estimated premia for a good degree are very similar for the earlier two cohorts and one cannot reject the hypothesis that the estimated wage premium for a good degree was constant across the two. In contrast, the premium for those born in 1979-80 is very poorly determined. Finally, there is some indication in Panel A, for the 28-31 age group, that the estimates are highest – at 11.7% – for the latest cohort, those born in 1981-82 – but we do not regard this as clear evidence of a rising premium as the other estimates for this age group are not statistically significant. We note that, across all the cohorts, where the estimates of the premia are statistically significant they tend to cluster in the neighbourhood of 9% to 11%.

We conclude from the LFS data that we have not found robust evidence of clear patterns of change in the premium for a good degree over the cohorts we have considered. We note, however, that this analysis is based on comparisons across cohorts through a limited observation window and with relatively small sample sizes. Furthermore, given the structure of the data, we cannot draw inferences about whether returns for individuals of given ages are changing because of cohort-specific effects (such as changes in the HE participation) or because of period effects (such as differences in the state of the labour market).

5.2 Evidence from USR/FDS data: birth cohorts circa 1964 to 1977

In Table 2, we presented USR/FDS-based estimates of the occupational earnings premium for a good degree over a lower degree class for students graduating in 1991 and born between 1969 and 1971. Table 4 reports equivalent estimates from OLS regression of equation (1), based on USR/FDS data for cohorts of students graduating in each year from 1985 to 1993.

The estimates presented in Table 4, for all universities, indicate that the premium for a good degree was fairly constant (at 2-3%) over cohorts graduating between 1985 and 1990 (a test cannot reject the null hypothesis of constancy of these estimates). This was a period in which the HE participation index was also broadly stable. For cohorts graduating after 1990 the estimated premium for a good degree increased to reach 6% by 1993. This is consistent with the hypothesis that the increase in HE participation after 1987 (when the typical 1990 graduate would have matriculated) contributed to an increase in the premium for a good degree relative to a lower degree class. It is also consistent with the related result of Walker and Zhu (2008), who found that, for men, while there was no significant reduction in the average return to a degree despite expansion, the return to a degree increased for graduates in the top quartile of the residual wage distribution and fell for those in the bottom quartile.

It is perhaps particularly surprising that the estimated premium for a good degree, based on USR/FDS data, more than doubled between 1985 and 1993 given that the proportion of good degrees awarded increased from 38% to 47% during that period. One would have expected an increase in the proportion awarded to have had a counterveiling effect on the good degree premium.

The estimates presented in Table 4 do not support a business cycle hypothesis that the graduate unemployment rate drives degree class premia. If the rising unemployment rate among graduates from 1991 to 1993 was a driver of the increased premium in that period, one would have expected periods of falling unemployment to have lowered the premium. However, the falling graduate unemployment rates during the period 1985 to 1990 appear to have had no discernible impact on the good degree premium. Nor do we see the results as explained by skill biased technological change as any impact of technology on degree class premia would not be predicted specifically after 1990.

Table 4: Estimated log-earnings premia for a good degree (USR-HESA/FDS: selected cohorts for All students and by university type for graduates aged 21-23)

Cohort	1985	1986	1987	1988	1989	1990	1991	1992	1993	1998
All	0.025	0.026	0.023	0.030	0.021	0.034	0.043	0.061	0.064	0.064
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
HE pop[n]	80947	79057	80655	82738	83360	84656	83932	94863	99569	103519
R^2	0.499	0.468	0.427	0.421	0.399	0.373	0.336	0.275	0.273	0.214
					Older Civic Universities					
	0.028	0.025	0.027	0.033	0.023	0.035	0.051	0.066	0.080	0.067
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[36.1]	[36.5]	[36.7]	[36.3]	[35.9]	[36.5]	[35.5]	[36.7]	[36.6]	[33.3]
					Newer Civic Universities					
	0.028	0.025	0.029	0.036	0.031	0.042	0.051	0.059	0.048	0.048
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[15.7]	[15.3]	[15.6]	[15.4]	[15.4]	[15.7]	[16.2]	[16.1]	[16.7]	[15.1]
					Ex-CAT Universities					
	0.013	0.025	0.027	0.021	0.012	0.026	0.039	0.045	0.063	0.058
	(0.03)	(0.00)	(0.00)	(0.00)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[14.1]	[13.9]	[13.6]	[13.7]	[14.3]	[14.0]	[13.8]	[14.3]	[14.2]	[15.6]
					1960s founded Universities					
	0.038	0.040	0.035	0.036	0.024	0.032	0.051	0.065	0.060	0.060
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[15.8]	[15.7]	[15.4]	[15.4]	[15.9]	[15.7]	[16.3]	[15.9]	[15.7]	[16.8]
					Other Scottish Universities					
	0.016	0.012	0.024	0.020	0.017	0.049	0.034	0.051	0.059	0.060
	(0.09)	(0.23)	(0.02)	(0.05)	(0.13)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
	[8.5]	[9.0]	[8.9]	[8.9]	[8.7]	[8.5]	[8.1]	[7.5]	[7.7]	[8.0]
					Other Welsh Universities					
	0.017	0.053	0.028	0.024	0.016	0.045	0.001	0.091	0.067	0.086
	(0.28)	(0.01)	(0.11)	(0.16)	(0.36)	(0.03)	(0.97)	(0.00)	(0.01)	(0.00)
	[2.5]	[2.4]	[2.6]	[2.9]	[2.7]	[2.7]	[2.8]	[2.8]	[2.9]	[5.0]

Notes: See notes to Table 2. Good degree premium is relative to a lower degree class. Ability and Background controls are included. Numbers reported in squared parentheses are the % of the total cohort in each of the university types. Figures for the separate category "Oxbridge" are not reported for reasons of protection of anonymity. University types are defined in the Appendix.

In addition to the USR/FDS data for 1985 to 1993 graduates, we have also examined the equivalent HESA/FDS files for the 1998 cohort, who matriculated just as the participation rate was reaching a peak of about 33%. Under the expansion-induced compositional change hypothesis, one might have expected the premium for a good degree to have continued to rise from the figure of 6.4%, estimated for the 1993 graduates. Instead, results reported in the final column of Table 4 indicate that the premium seems to have stabilised at 6.4% for the

1998 cohort.[17] One possible explanation for this is that the proportion of good degrees awarded continued to rise, reaching 54% in 1998.

Table 4 also reports the estimated good degree class premia for each cohort separately by university type. The results are surprisingly robust and consistent with the idea that both the level of and the trends in the value of a good degree are relatively constant across different categories of university. It can also be observed that the proportions of the USR populations by university type were essentially constant over the 1985-1993 cohorts.

We have also exploited GCS1985 data to compare with our results for GCS1990 and thereby examine further the USR/FDS result that the good degree was relatively constant through the period 1985 to 1990. Table A3 reports results, showing that at ages 26-28 the estimated premium is constant at 7.9% for both cohorts, with some evidence that initial career premia were a little higher, at 6.4%, for 1985 graduates than for 1990 graduates, at 4.9% – though we cannot reject the hypothesis of constancy over this period.

5.2.1 Inequality inflation versus structural effects

The estimated premia reported in Table 4 are based on matching, for each cohort, contemporaneous occupational earnings data for the respective year. Hence, it is possible that the increase in the estimated premia reflects what we might term an 'inequality-inflation' effect. Suppose that the class of degree awarded affects the individual's labour market outcome – for example, the graduate's place in a queue for better jobs, as measured by occupational earnings – but that this 'structural' effect is constant and not influenced by HE expansion. Then, nevertheless, we might observe an apparent change in the effect of degree class (i.e., a rise in the estimated premium) if a general increase in pay inequality – as was occurring over this time frame – leads to a widening spread in pay differentials by educational attainment.

To distinguish between an inequality-inflation effect and a structural effect – in which degree class is genuinely becoming more important in determining graduates' labour market outcomes – we re-run the analysis reported in Table 4, replacing contemporaneous occupational earnings with a measure of earnings calculated as earnings for each occupation averaged over all years. The results do not change, giving strong support to the conclusion that there was a material change in the way in which degree class affected labour market outcomes of graduates over these cohorts.

5.2.2 Premia for separate degree classes

To this point in the paper, we have drawn a binary distinction between good and lower classes of degree by grouping together separate degree classes. The motivation for this is that cell sizes become too small to estimate separate class effects with any precision in the BCS70 and LFS datasets. However, this is not a problem in the USR-HESA/FDS data. Figure 1 plots the occupational earnings premia for the 1985 to 1993 (and also the 1998) graduating cohorts

[17] Estimates are based on HESA data for institutions covered in the USR files. Results are robust to inclusion of all institutions covered by HESA – that is, those either before or after the abolition of the binary divide in 1992.

for the award of: first, lower second and third class degrees relative to the default case of an upper second class degree.

From Figure 1 we see, for earlier cohorts, the narrow and essentially constant spread in occupational earnings by specific class of degree awarded, similar to the results reported in Table 4 for aggregated classes of degree, with a clear tendency for the spread to widen markedly for cohorts graduating from 1991 onwards.[18] In 1985, the premium for a first relative to an upper second is initially less than 1% and the spread between a first and a third is about 4%. By 1993 the premium for a first over an upper second has risen to 4% and the spread between a first and a third has increased to over 10%. The major difference from the pattern of evidence presented in Table 4 is that there is a continued increase in the premium for a first class degree between 1993 and 1998 – while there was a slight fall in the earnings gap associated with a lower second relative to an upper second. This is consistent with evidence that the rise in the proportion of good degrees between 1993 and 1998 was generated disproportionately by a relative increase in upper seconds, which is likely to have increased the scarcity or signalling value of a first class degree: of good degrees awarded, the percentage of first class degrees fell by 14% between 1993 and 1998.

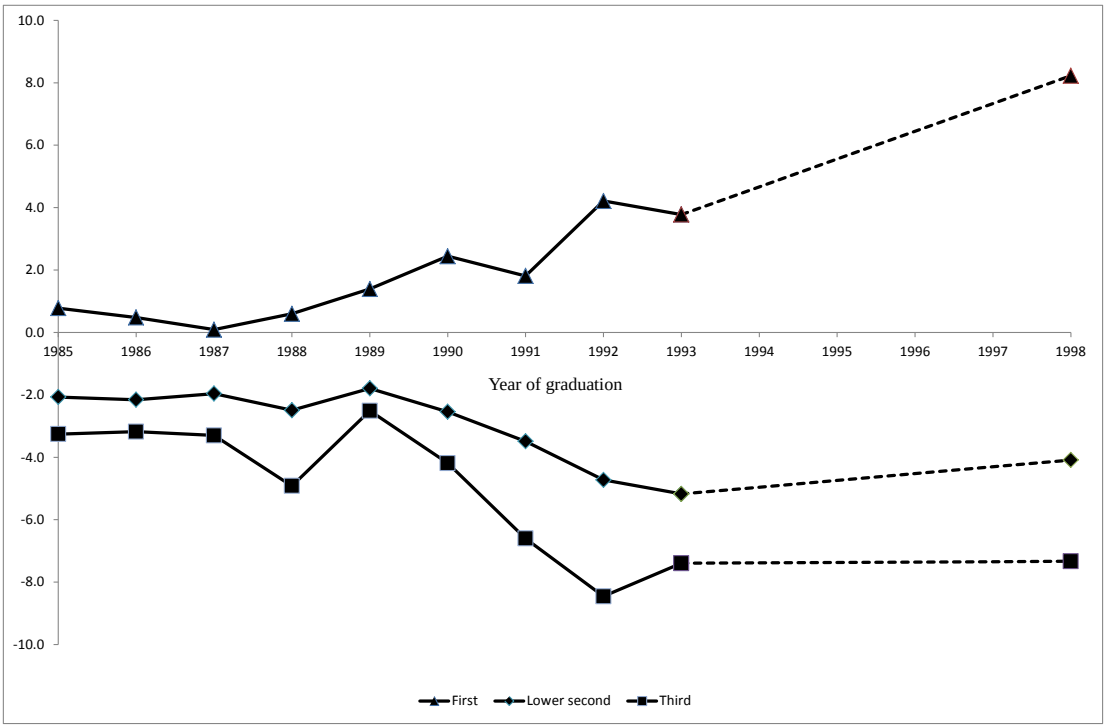


Figure 1: Estimated log occupational earnings premia by separate degree class, relative to default of lower second class (USR/FDS: 1985 to 1993 and HESA/FDS: 1998)

We conclude that the evidence based on USR-HESA/FDS data indicates that the premium for a good degree increased over the period of HE expansion. As evidence based on USR-HESA/FDS data do not capture intra-occupational differences, it is possible that our estimates under-state both the level and also the extent of the increase of degree class premia.

[18] Estimated premia are based on deflated contemporaneous earnings data; results are unchanged with earnings averaged across cohorts.

6 Conclusions and further remarks

We have focused on two central questions: is there a premium associated with the level of educational achievement at university (as measured by class of degree awarded); and how has any such premium varied across cohorts? From BCS70 data, we obtain an estimate of a wage premium of 7% – 8% for a good degree relative to a lower degree at age 30 (and at 38) for graduates born in 1970 and graduating in 1991. We view the estimated premium to be large when we consider that our estimate of the premium for a lower degree class relative to A-levels is 11% at age 30. The implication is that there is a large dispersion around the average return to a degree according to the class of degree awarded. Evidence of substantial variation in graduate returns by academic performance creates a public policy concern if the perception that investment in HE is risky acts as a disincentive to participate – particularly if those from lower participation backgrounds are less confident of performing well at university.

Using LFS data on graduates born close to 1970, we obtain estimates for the good degree premium which are very similar to BCS70-based estimates and this gives us confidence that LFS-based estimates do not suffer particularly from omitted variable bias associated with the relative absence of controls for personal characteristics. We then construct birth cohorts from LFS data covering the period of HE expansion in an attempt to identify any trends in degree class premia across cohorts. Our estimates of the premium for a good degree tend to cluster in the region 9% –11% but do not reveal robust evidence of any clear upward or downward trend. One reason for this might lie in the relatively small cell sizes in LFS data, which we address by exploiting administrative data on full populations of university graduates, matched to first destination survey data.

For graduates born in or close to 1970, analysis of USR/FDS data produces an estimate of approximately 4.5% for the good degree premium. This is based on occupational earnings within one year of graduation. Analysis of GCS1990 data for similar birth cohorts suggests a good degree premium of 5% based on personal earnings information one year from graduation, consistent with USR/FDS estimates, and of 8% six years out from graduation, consistent with BCS70 and LFS results.

From analysis of USR-HESA/FDS data on a series of cohorts, we find that the occupational earnings premium associated with a good degree class was very modest (at less than 3%) until HE participation began to rise markedly over the cohorts graduating between 1991 and 1998, by which time the premium had increased to more than 6%. We have also found evidence that much of the increase in the premium for a good degree after 1990 was realised by 1993 as the participation index rose from 15% towards 20% of the age cohort. We explain the absence of clear evidence of further increases in the good degree premium by the observation that the proportion of students awarded good degrees grew markedly between 1993 and 1998, when HE expansion tailed off. We also find that the premium associated with the award of a first class degree (relative to an upper second) grew significantly over the period in which expansion was occurring.

Our results corroborate findings of Walker and Zhu (2008), who report that, although the average return for a degree did not change during the period of expansion, returns to the upper quantile of male graduates did increase, consistent with the hypothesis that trends in the good degree premium reflect expansion-induced compositional changes. Intuitively, the greater the proportion of the cohort obtaining a degree, the more valuable it appears to be to attain a good class of degree and thereby stand out from the growing crowd.

We cannot identify, however, whether the estimated premium for a good degree arises from signalling or because degree class is a proxy for underlying marks and associated human capital. For that, detailed analysis of single institution data on both degree class and course marks is an important direction for related work (see Feng and Graetz, 2015, and di Pietro, 2010). If degree class acts as a crude sorting mechanism for graduate employers, then this might be a further justification for the current trend in the UK away from the traditional system based on degree classification and towards the issuing of detailed transcripts and grade point averages. If marketisation of HE in the UK leads to further grade inflation through the award of higher proportions of good degrees, then this, *ceteris paribus,* is likely to reduce the good degree premium in the future. It will be informative to base future research on more recent cohorts (for example, on longitudinal studies of later birth cohorts) in order to examine further the impact on degree class premia of potential factors such as the HE participation rate, degree class distributions and the state of the graduate labour market.

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Appendix

Table A1: Estimated log wage premia (LFS), birth cohorts 1969-1971

Wages observed at:	2005-2012
Wages observed at age:	36-41
Good degree class premium	0.088
(*relative to lower degree class*)	(0.001)
Lower degree class	0.188
(*relative to 2+ A-levels*)	(0.000)
Other controls	Yes
No. of Obs	2973
R^2	0.152

Notes: p-values reported in parentheses. Dependent variable is log hourly wages observed between 2005Q1 and 2012Q4 and deflated by the average earnings index. Other controls include: gender, marital status and number of children, ethnicity and tenure with current employer.

Table A2: Estimated log pay premia for a good degree (GCS 1990), birth cohort 1968-1970

Wages observed at:	1991	1991	1996	1996
Wages observed at age	21-23	21-23	26-28	26-28
Good degree class premium	0.051	0.049	0.084	0.079
relative to lower degree class	(0.014)	(0.014)	(0.014)	(0.014)
Ability and background controls	*No*	*Yes*	*No*	*Yes*
Other controls	*Yes*	*Yes*	*Yes*	*Yes*
No. of Obs	2839	2839	3652	3652
R^2	0.127	0.131	0.115	0.119

Notes: p-values reported in parentheses. Dependent variable is the log of the self-reported hourly wage. Ability controls include pre-university qualifications. Background controls include parental education, and other controls include age, gender, ethnicity, and marital status.

Table A3: Estimated log pay premia for a good degree (GCS 1985 and GCS 1990)

Graduate cohort	1985	1985	1990	1990
Wages observed at	1986	1991	1991	1996
Wages observed at age	21-23	26-28	21-23	26-28
Good degree class premium	0.064	0.079	0.049	0.079
relative to lower degree class	(0.023)	(0.020)	(0.014)	(0.014)
No. of Obs	1330	1738	2839	3652
R^2	0.139	0.150	0.131	0.119

Notes: p-values reported in parentheses. See notes to Table A2. Ability and Background controls included.

University Types

Older Civic Universities: typically founded in industrial towns and cities during the first decade of the 20th Century (often referred to as 'Redbrick' universities). Examples include Cardiff, Birmingham, Manchester and Leeds.

Newer Civic Universities: typically founded by or during the 1950s, often from former university colleges. Examples include Swansea, Nottingham, Leicester and Exeter.

Ex-CAT Universities: typically founded as technical colleges in the first half of the 20th Century and upgraded to university status during the 1960s or 1970s. Examples include Aston and Strathclyde.

1960s Founded Universities: typically purpose-built and often labelled as the 'campus' universities. Examples include Lancaster, Sussex and Warwick.

Other Scottish Universities: Glasgow, Edinburgh, Aberdeen and St Andrews.

Other Welsh Universities: Examples include Bangor and Aberystwyth.

A full listing of all universities by type is available from the authors on request.

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